Star.	Δ Epoch.	Δ θ	ρ disc.	$\rho_1 - \rho$	Mag.
A 417	13.0	+ 146. 5	0. 19	— 0. 03	6.0 — 6.0
A 431	12.0	— 84. 8	0. 19	+ 0. 04	8.5 — 8.5
A 494	12.0	+ 159. 0	0. 14	+ 0. 03	6.9 — 7.8
A 570	12.2	— 119. 6	0. 20	— 0. 02	6.3 — 6.5
A 606	12.3	+ 41. 1	0. 28	+ 0. 02	8.8 — 8.8
A 632	11.9	— 50. 8	0. 45	— 0. 11	8.0 — 8.7
A 693	11.0	— 49. 8	0. 19	— 0. 02	9.0 — 9.0
A 751	10.2	— 67. 5	0. 16	— 0. 03	6.8 — 7.3
A 883	10.9	— 227. 4	0. 14	+ 0. 02	7.6 — 7.8
A1014	9.9	+ 40. 1	0. 25	+ 0. 10	8.6 — 8.6
A1238	10.2	— 46. 7	0. 25	+ 0. 01	7.4 — 7.6

It is practically certain that the motion in all of these systems is orbital. A 751 is too close to measure this year, and the two measures last year were made with great difficulty and are discordant. The change of 227° in A 883 is assigned on the evidence in intermediate years that the motion is retrograde. This year the quadrant was indeterminate.

ROBERT G. AITKEN.

November 4, 1915.

THE REMODELED 60-FOOT TOWER TELESCOPE.

In its original form, the 60-foot tower telescope was constructed as cheaply as possible, using a single standard water-tank tower built by the Aermotor Company, and small canvas-covered shelters for the coelostat and second mirror. Its very satisfactory performance made a more permanent arrangement desirable, and it has accordingly been provided with a second tower, supporting a dome, and a closed tube, with double walls, extending from top to bottom and thus protecting the vertical light beam from cross currents of warm air near the ground. The temporary house at the foot of the tower has also been replaced by a concrete structure, enlarged sufficiently to give space for a photographic dark-room.

At the same time various important changes have been made in the auxiliary equipment. The 30-foot spectrograph, improved in various details, may now be easily transformed into an 18-foot spectrograph for use with a quartz invar interferometer. It has also been provided with vacuum and mercury arcs, a device for exposing simultaneously on the arc and solar image, and other new accessories. A 13-foot spectro-heliograph

has also been constructed and installed beside the spectrograph. The frame of angle iron which supports the optical parts is suspended in the underground chamber from a heavy carriage resting on four steel balls, moved as a whole by an electric motor. Thus the solar image and photographic plate are stationary, while the collimator and camera slits move with the spectro-heliograph across them. The 4-inch plane grating used in this instrument, which is extremely bright in the first order, was ruled by ANDERSON. As the axes of the collimator and camera lenses are parallel, the beam, after leaving the grating, falls on a plane mirror, from which it is reflected thru the camera lens. This mirror may be moved along the axis of the camera lens, thus making it possible to change the angle between the incident and diffracted beams and hence to vary the linear dispersion of the first order spectrum.

In work with the spectro-heliograph it is often desirable to determine small displacements of flocculi not measureable by existing methods, because of local distortions due to drift of the image during the exposure, temporary poor seeing, changing refraction during long exposures with low sun and other causes. The 13-foot spectro-heliograph is accordingly provided with two camera slits, one of which may be set on $H\alpha$ or any desired line), while the other, at a distance of several inches, is set on the continuous spectrum. Thus two images of the same region of the Sun may be photographed simultaneously on a single plate, one showing the flocculi surrounding a group of sun-spots, the other the spots themselves. Fine wires stretched across the collimator slit, together with the images of the two camera slits at the end of the run, furnish the necessary fiducial lines, with reference to which the positions of spots and flocculi can be measured. Thus the motions of flocculi can be determined differentially with reference to spots on solar images affected in precisely the same degree by any source of distortion.

By providing two gratings or two mirrors below the camera lens, two images of the spectrum from a single collimator slit can be produced side by side. Thus by setting one camera slit on the red edge of $H\alpha$ in one spectrum and a second camera slit on the violet edge of $H\alpha$ in the other spectrum, photographs

of flocculi can be obtained with the two edges simultaneously. Similarly two or even three photographs, showing sections of the flocculi at as many different levels, can also be taken simultaneously.

The results obtained with the 13-foot spectro-heliograph are very satisfactory, showing the advantages of improved definition of the solar image, high dispersion and freedom from diffuse light in the spectro-heliograph and exceptional smoothness of motion. Successive photographs of the disk made with the $H\alpha$ line, when combined in a stereoscope, show the flocculi standing in high relief, and clearly indicate the identity of the very dark hydrogen flocculi (called "filaments" by DESLANDRES) with prominences, in which form they are subsequently photographed when carried to the limb by the Sun's rotation.

GEORGE E. HALE.

PROGRESS OF WORK ON THE 100-INCH TELESCOPE.

The close of the 1915 construction season finds the steel dome for the 100-inch telescope completely enclosed and in working order, tho considerable miscellaneous work remains to be done. This includes the exterior sheathing of the fixed portion of the building (the inner wall of which is in place), the construction and erection of the observing platform and cage-hoist, exterior and interior painting, etc. It is satisfactory to find that the dome turns very smoothly and easily on the rails, which were finished true after erection with a high-speed grinder carried by a radial arm pivoted at the center of the building. This is a matter of importance, as the high dispersion spectrograph for stellar spectra, to be mounted on a pier in line with the polar axis, must be free from vibration during the very long exposures which will be required.

Two carloads of parts of the telescope mounting are already on Mount Wilson and four carloads are on the way from the Fore River Ship Yards at Quincy, Massachusetts, where the heavier work has been done. The balance will follow very soon, excepting the tube, which was to come by the Panama Canal, now closed to traffic because of slides. Many of the smaller parts of the mounting, including the driving clock, have been completed in our Pasadena instrument shop.